LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, Sept. 7-10, 2010

Every quadruple BTU helps

Americans used less energy last year than in 2008, according to new energy-use charts produced by the Laboratory.

"Part of the reason is [that] the whole economy shrank," said A.J. Simon, an energy analyst at Livermore who calculated that overall energy use in the country dropped from 99.2 quadrillion BTUs in 2008 to 94.6 quadrillion in 2009. "People are doing less stuff overall, using less oil, saving money."

Another reason, Simon added, is that the residential, industrial, commercial and transportation sectors of the economy are using more products that are energy-efficient.

"People put in [compact fluorescent light bulbs]," Simon said, "and they actually use less electricity, and that change percolates all the way through the energy system."

To read more, go to the Web.

Lab team Swats competition

Fast and accurate marksmanship gave a boost to the Laboratory's SWAT team, which won the top spot in the recent Connecticut SWAT Challenge. The challenge drew 40 teams and 1,000 officers from across the country.

A list of results for the three-day event last month showed the team from the Laboratory in first place, with top scores in five of the seven challenge events.

The Central Region No. 1 team, composed of officers from Bristol, Plainville and Southington, Conn., placed second and the Connecticut State Police No. 1 team was third.

The event, begun six years ago by the West Hartford police department, is now the second largest SWAT competition in the nation. Activities include hostage rescue, target shooting, sniper, obstacle courses for teams and a 4.8 mile physical challenge marathon for each team.

To read more, go to the Web.

Clean energy in the East

Two consortia – one led by West Virginia University that includes Lawrence Livermore and one led by the University of Michigan – will receive a total of $25 million during the next five years for the U.S.-China Clean Energy Research Center (CERC).

The project will facilitate joint research and development of clean energy technologies by the United States and China. The West Virginia University consortium that includes LLNL will develop and test new technologies for carbon capture and sequestration.

"We believe strongly that cooperation between the United States and China on clean coal and carbon capture and sequestration (CCS) is critical to national security and global energy and environmental interests," said Julio Friedmann, LLNL's director of the carbon management program and technical program manager for the partnership. "We are honored to be selected with our partners to help facilitate this important new chapter in Sino-U.S. collaboration.

CCS is a process that separates and captures carbon dioxide (CO_2) from industrial and power plant flue streams, then compresses the gas and stores it underground, most likely in geological formations.

To read more, go to the Web.

Getting the bugs out

Laboratory researchers are collaborating to create a new automated tool that debugs nuclear weapons simulations.

The program, called AutomaDeD (pronounced like automated), finds errors in computer code for complex "parallel" programs. The simulations take several weeks to run, and then they have to be debugged to correct errors in the code.

Because international treaties forbid the detonation of nuclear test weapons, certification is done using complex simulations. The simulations, which may contain as many as 100,000 lines of computer code, must accurately show reactions taking place on the scale of milliseconds, or thousandths of a second.

"Many times an error in a simulation code may not become evident until long after it occurs," said Bronis R. de Supinski, co-leader of the ASC Application Development Environment Performance Team at Lawrence Livermore. "These delays are challenging since they make the actual location of the bug unclear."

In parallel operations used for powerful simulation tools, a highly complex job is split into numerous smaller and more manageable processes that are handled by separate machines in large computer clusters. After the computers complete their individual processes, all of the parallel results are combined.

To read more, go to the Web.

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